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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/473,361	12/28/1999	MIN-GOO KIM	678-434	9895

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EXAMINER	
ODOM, CURTIS B	
ART UNIT	**PAPER NUMBER**
2634	

DATE MAILED: 05/19/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/473,361	KIM ET AL.
	Examiner	Art Unit
	Curtis B. Odom	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *1-3, 5* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-10,12 and 13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-10,12 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 March 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-3, 7, and 8 are objected to because of the following informalities: The character "l" is suggested to be changed to "n" (see instant specification, pg. 5, lines 1-6). Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5-10, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon et al. (U. S. Patent No. 5, 727, 029) in view of Zandi et al. (previously cited in Office Action 12/1/03).

Regarding claim 1, Jeon et al. discloses a quantization method for an iterative decoder (column 1, line 45-column 2, line 65), comprising the steps of:

equally dividing (column 2, lines 60-65 and column 10, lines 9-13) received signal levels into predetermined intervals, wherein dividing the signal into quantization levels divides the signals levels into predetermined intervals; and

quantizing (Fig 2, block 40, column 1, line 66-column 2, line 2) the level of a signal received in each period, using the predetermined intervals,

wherein the iterative decoder includes at least one component decoder (Fig. 6, column 5, line 11-column 6, line 52), the at least one component decoder computing a metric using a predetermined number of bits (one or two bits) more than a number of bits (4 bits of the received codeword) required to represent the received signal levels (column 6, lines 40-42).

Jeon et al. does not disclose the intervals occupy a range $m \times 2^l$ where the transmission signal level from the transmitter is m.

However, Zandi et al. discloses that quantization levels can be a function of the transmission channel (column 47, line 64-column 48, line 4). Dividing the received signal into levels as a function of the transmission channel would allow the quantization levels to be a function of the transmission channel. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that to modify the method of Jeon et al. with the teachings of Zandi et al. and choose the intervals to occupy a range of $m \times 2^l$ (where m is the transmission signal level) in order to properly cover the entire signal span and reduce the probability of error during quantization by having a received signal level fall outside of the predetermined intervals.

Regarding claim 2, which inherits the limitations of claim 1, Jeon et al. does not disclose l is 2. However, Jeon et al. discloses dividing the signal span equally (column 2, lines 60-65 and column 10, lines 9-13). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that the intervals could have been chosen to occupy a range

of m x 2^2 in order to properly cover the entire signal span and reduce the probability of error during quantization by having a received signal level fall outside of the predetermined intervals.

Regarding claim 3, which inherits the limitations of claim 1, Jeon et al. does not disclose l is 1. However, Jeon et al. discloses dividing the signal span equally (column 2, lines 60-65 and column 10, lines 9-13). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that the intervals could have been chosen to occupy a range of m x 2 in order to properly cover the entire signal span and reduce the probability of error during quantization by having a received signal level fall outside of the predetermined intervals.

Regarding claim 5, which inherits the limitations of claim 1, Jeon et al. discloses the predetermined number of bits are two bits when the iterative decoder has code rate of ¼ or above (column 6, lines 40-52), wherein the code rate is 1/3 (column 2, lines 12-24).

Regarding claim 6, which inherits the limitations of claim 1, Jeon et al. discloses each component decoder operates on an input signal using a MAP or soft output Viterbi algorithm (column 1, lines 6-10).

Regarding claim 7, Jeon et al. discloses a quantization method for a turbo decoder (column 1, line 45-column 2, line 65) in a communication system, wherein a Viterbi decoder can be a turbo decoder, comprising the steps of:

equally dividing (column 2, lines 60-65 and column 10, lines 9-13) received signal levels into quantization intervals;

quantizing (Fig 2, block 40, column 1, line 66-column 2, line 2) the level of a signal received in each period, using the intervals,

wherein the iterative decoder includes at least one component decoder (Fig. 6, column 5, line 11-column 6, line 52), the at least one component decoder computing a metric using a predetermined number of bits (one or two bits) more than a number of bits (4 bits of the received codeword) required to represent the received signal levels (column 6, lines 40-42).

Jeon et al. does not disclose dividing the received signal levels into 8 or 16 quantization scaling factor intervals using 5 to 7 quantization bits, wherein the intervals occupy a range $m \times 2^l$ where the transmission signal level from the transmitter is m.

However, Zandi et al. discloses that quantization levels can be a function of the transmission channel (column 47, line 64-column 48, line 4). Dividing the received signal into levels as a function of the transmission channel would allow the quantization levels to be a function of the transmission channel. The number or quantization intervals and quantiztion bits would then be dependent on the transmission channel. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that to modify the method of Jeon et al. with the teachings of Zandi et al. and choose the intervals to occupy a range of $m \times 2^l$ (where m is the transmission signal level) using 8 or 16 quanitzation intervals using 5 to 7 quantization bits in order to properly cover the entire signal span and reduce the probability of error during quantization by having a received signal level fall outside of the predetermined intervals.

Regarding claim 8, which inherits the limitations of claim 7, Jeon et al. does not disclose l is 2. However, Jeon et al. discloses dividing the signal span equally (column 2, lines 60-65 and column 10, lines 9-13). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that the intervals could have been chosen to occupy a range

of m x 2^2 in order to properly cover the entire signal span and reduce the probability of error during quantization by having a received signal level fall outside of the predetermined intervals.

Regarding claim 9, which inherits the limitations of claim 7, Jeon et al. does not disclose the number of quantization bits is 6. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the number of quantization bits would have been chosen to efficiently quantize the signal. Thus, claim 9 is deemed a design choice and does not constitute patentability.

Regarding claim 10, which inherits the limitations of claim 9, Jeon et al. does not disclose the quantization scaling factor interval is 8. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the of quantization scaling factor interval would have been chosen to efficiently quantize the signal. Thus, claim 10 is deemed a design choice and does not constitute patentability.

Regarding claim 12, which inherits the limitations of claim 7, Jeon et al. discloses the predetermined number of bits are two bits when the iterative decoder has code rate of ¼ or above (column 6, lines 40-52), wherein the code rate is 1/3 (column 2, lines 12-24).

Regarding claim 13, which inherits the limitations of claim 7, Jeon et al. discloses each component decoder operates on an input signal using a MAP or soft output Viterbi algorithm (column 1, lines 6-10).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom
May 12, 2004

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